Archived Data User Service
Self Evaluation Report

Prepared for:

Federal Highway Administration
Nevada Department of Transportation

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Self Evaluation Report

1. EXECUTIVE SUMMARY

The Archived Data User Service (ADUS) is a recent addition to the National Intelligent Transportation System (ITS) Architecture. This user service "required ITS system to have the capability to receive, collect and archive ITS-generated operational data for historical, secondary and non-real-time uses". This data can be used for transportation planning, safety and research applications.

Recognizing the potential benefits of adding ADUS to the ongoing effort to implement an integrated Freeway and Arterial Management System in the Las Vegas area, the Nevada Department of Transportation (NDOT) engaged the services of Kimley-Horn and Associates to conduct a study and perform the design for the implementation of ADUS. The major elements of this effort include needs assessment, update of the Functional Requirements, update of the Regional ITS Architecture for the Las Vegas area and Design of ADUS. This project was federally funded under the FY-99 ITS Deployment Program. The total project cost is approximately $225,000, of which NDOT's share is $120,000 and FHWA's share is $105,000. The next phase of this project will include the development and implementation of the ADUS system, which is expected to be completed by 2003.

This Self-Evaluation Report includes a summary of the work completed during the project. There were no outstanding technical, institutional or legal issues identified that would curtail implementation of the ADUS within the FAST.

2. PROJECT GOAL

The primary goal of this project is to **Design** an ADUS that will provide the capability to receive, collect, store, summarize and distribute data generated by the Freeway and Arterial System of Transportation (FAST). This data will be available for use by all stakeholders of FAST and will assist in facilitating traditional transportation activities including:

- Short and long range planning
- Transportation system monitoring
- Transit management
- Air quality analysis
- Safety analysis
- Inter-modal planning
- Transportation research
- Emergency management
- Commercial vehicle operation
- Traffic engineering analysis

3. PROJECT REVIEW

To achieve this goal, the following objectives were accomplished.

3.1 Educated Stakeholders about ADUS and built consensus on the implementation priority for the various components of ADUS

A series of one-on-one interviews, as well as monthly stakeholder meetings, were conducted to familiarize the stakeholders with the ADUS concept, to assess the needs of each stakeholder agency, and to identify their desires as to the type and format of the information to be handled by ADUS.

Overall, the stakeholders expressed strong support for the program and identified several benefits such as enhanced productivity and improved data accuracy that could be accomplished by the implementation of ADUS.

3.2 Assessed Stakeholder Data/information Needs and Priority

- Stakeholders gave arterial, freeway and incident data the highest ranking in terms of importance to them.
- Many agencies had an interest in accessing archived data for use in fine tuning the regional model.
- ADUS should be made available to the general public and private consulting community. The availability of traffic signal phasing and volume information would result in timesavings to stakeholder agency employees.
- There are limited information related to construction work zone/lane closures and commercial vehicle operations available at this time.

3.3 Developed ADUS Functional Requirements

The development of the ADUS functional requirements and the update to the regional architecture was based on the national architecture. The five major functions of ADUS are:

- Historical data archive system
- Data control
- Data import and verification
- Automatic data historical archive
- Data warehouse distribution
- User interface

These functional requirements were designated for initial deployment or future deployment based on their level of importance.

3.4 Updated Regional Architecture

- Two new market packages, ITS data warehouse and ITS virtual data warehouse were added to the regional architecture.
- Four equipment packages were also added:
  - Government Reporting System Support
  - ITS Data Repository
  - On-Line Analysis and Mining
  - Traffic and Roadside Data Archival
- The Regional Interconnect Diagram and Market Package Diagram were updated to include the architecture subsystem equipment packages, system terminators and architecture flows for ADUS.

3.5 ADUS Design

The ADUS design describes the major hardware and software components and the communication and data exchange interfaces to be implemented. It covers the following:

- Data collection and storage
- Data retrieval
- Information management technologies
- Archive database
- System configuration
- Communication interfaces
- Application software requirements
- Acceptance testing
- Documentation requirements

4. INSTITUTIONAL AND LEGAL ISSUES

4.1 Availability of Data

A good portion of the data to be archived would be generated by FAST. Freeway traffic flow surveillance, dynamic message sign, Trailblazer, ramp meter, and freeway incident information would be available from the freeway management module. Arterial information, such as signal phasing and arterial traffic flow surveillance should be available from the Las Vegas Area Computerized Traffic System (LVACTS) or Arterial Management System (AMS) module.

Information could also be provided by sources external to FAST. Certain information from accident records that are not generated by the FAST system are available from Nevada Highway Patrol (NHP) or NDOT's traffic safety division. Data from existing NDOT traffic count stations on freeways and arterials could also be imported into ADUS. A great deal of transit data, such as ridership, schedules, and route deviations, should be available from the Regional Transportation Commission (RTC) who operates the fixed route and paratransit CAT system. Train arrival information at signals may be determined from the AMS information based on the preemption records. Limited commercial vehicle data is available from NDOT's weigh-in-motion (WIM) stations. ADUS will strive to allow for more data to be collected in the future, for example, mobile data terminals in the NHP vehicles might log incidents that could be linked directly to FAST.

Emergency vehicle locations or dispatch records, construction and work zone data, permit data, and most commercial vehicle data would not be readily available in the initial implementation of ADUS.

4.2 Desired Formats

All stakeholders have access to database programs for using the data retrieved from the archived data store. Several of the databases available to the different agencies included MSAccess, FoxPro, Dbase, and Oracle. The Internet was a commonly requested outlet for obtaining the data on a monthly, quarterly, or as-needed basis. As-needed, self-defined reports obtainable over the Internet in a compatible database format would suit most of the needs of the stakeholders. ADUS should allow agencies to generate reports consistent with system monitoring standards established by FHWA, ASTM and AASHTO.

4.3 Security

A tiered secure Internet source was suggested to keep protected and separate the information being provided for:

- agency use (such as accident records);
- industry use (such as signal timing data for private consultants); and
- the general public (such as traffic counts and annual reports made available by the Federal Highway Administration).

4.4 Archive Life

Stakeholders generally concurred that the data should be archived for three years. After the three-year period, it may only be necessary to retain information in a highly aggregated format.

4.5 ADUS Standards

FHWA is currently developing standards for archived data by following existing data standards. These standards include, but are not limited to:

- American National Standards Institute (ANSI) 16 and 20
- Model Minimum Uniform Crash Criteria (MMUCC)
- National Incident –Based Reporting System (NIBRS)
- Highway Performance Monitoring System (HPMS)
- Traffic Monitoring Guide
- AASHTO Guide for Traffic Data Programs
- Applicable ITS Standards (NTCIP, TCIP, etc)

5. BENEFITS

The Las Vegas area stakeholders will benefit from implementation of ADUS because the ITS-generated data will supplement and potentially replace existing, costly data collection programs. Other benefits include:

5.1 Enhanced Statistical Support

Currently, data is collected at a limited number of locations and for a limited time period. This data is then extrapolated to other locations and adjusted for seasonal variation. The completeness of the data to be generated by ADUS will greatly enhance the quality of this data and reduce the required effort to collect, validate and develop the data.

5.2 Use of Detailed Data in Transportation Modeling

Current modeling programs require a significant data collection effort to calibrate the model for base year conditions. The detailed data generated by ADUS will assist in this effort. In addition, the model can be calibrated over a longer period of time, thus greatly improving the integrity of the model.

5.3 Enhanced Transportation Planning

Transportation planning can use historical records from ADUS for trend analyses and. in combination with real-time data from the Advanced Traveler Information System (ATIS), to predict future conditions. Historical records could also be used in the congestion management system.

5.4 Evaluating and Monitoring the Benefits of ITS

Although it is often difficult to discern and isolate the benefits of a specific ITS project, the detailed data collected by ADUS will provide ITS professionals with the opportunity to evaluate and measure the effectiveness of ITS strategies in a more efficient manner.

5.5 Stimulating Support for ITS by New Users

Transportation planning professionals will use data available from ADUS for modeling and for traffic impact analyses. Maintenance departments and traffic engineering divisions will use ADUS to keep track of lane closures and construction zone activities.